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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

FOREST INSECT INVESTIGATIONS

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TITLE

FOREST INSECT SURVEY
FREMONT NATIONAL FOREST, OREGON
AND ADJACENT PRIVATE LANDS

Season of 1943

by

William D. Bedard

Forest Insect Laboratory
341 Giannini Hall, U. C.
Berkeley 4, California

March 7, 1944

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U. S. Department of Agriculture
Bureau of Entomology and Plant Quarantine
Forest Insect Investigations

FOREST INSECT SURVEY
FREMONT NATIONAL FOREST, OREGON,
AND ADJACENT PRIVATE LANDS

Season of 1943

Approved by:

F. P. Keen
Senior Entomologist, in Charge

Submitted by:

William D. Bedard
Associate Entomologist

Forest Insect Laboratory
341 Giannini Hall, U. C.
Berkeley 4, California
March 7, 1944

ABSTRACT OF RESULTS

A. The Reporting Area

1.	Total acreage	1,193,000
2.	Volume of pine	9,713,000,000

B. The 1942 Infestation (complete record)

1. Total pine timber killed on reporting area (Table 2)

a.	Number of trees	49,140
b.	Volume Bm.	29,580,000
c.	Average Bm. per acre	24
d.	Percent of total stand	0.30

2. Classification of infestation - low endemic

3. Primary insect - western pine beetle in ponderosa pine

4. Trend of infestation - slight decrease from 1941

C. The 1943 Infestation (partial record)

1. Primary insect - western pine beetle in ponderosa pine

2. Probable trend - sharp increase over 1942

3. Control work recommended - none

INTRODUCTION

The annual survey to determine the extent and amount of current insect infestation within the ponderosa pine stands of the Fremont National Forest, Oregon, and adjacent private lands was conducted again in 1943. This portion of the southern Oregon survey covers the timbered areas located east and north of Klamath Falls, Oregon, in Townships 25 to 41 South, and Ranges 8 to 22 East, exclusive of the Klamath Indian Reservation. This comprises mainly Weyerhaeuser Timber Company holdings and Fremont National Forest land, with small amounts of intermixed and adjacent private holdings.

Owing to the shortage of funds and field help this year, it was necessary to conduct the survey intermittently whenever assistance was available. For this reason, the survey check plots were cruised by various personnel at various times during the season from July 6 to October 10. The plots in the Silver Lake Area were cruised by J. M. Whiteside and W. J. Buckhorn of the Portland laboratory and P. C. Johnson of the Berkeley laboratory. The Dog Lake and Warner Mts. plots were cruised by R. C. Hall and C. E. Startt of the Berkeley laboratory with the help of a temporary assistant. The Currier Camp plot was cruised by J. W. Bongberg of the Berkeley laboratory and the writer. Most of the plots, however, were cruised by a crew comprising T. J. Orr, Jr., Forester for the Klamath Falls Branch of the Weyerhaeuser Timber Company, his assistants Don MacKay and Conrad Borsting, one of the Company's compassmen and the writer. Without this cooperative assistance, it would have been extremely difficult to have made a satisfactory survey of this area during 1943.

The survey this year completed the record of 1942 loss and secured partial 1943 loss within the reporting area. Estimates of 1942 infestation which appear in this report are based on a one hundred percent cruise of four 640-acre and thirteen 320-acre permanent sample plots, supplemented wherever possible by observational type examinations. Infestation trends were computed from the plot data and the general loss estimates for the various areas were based on these curves, the plot data and previous loss records.

Estimates of virgin timber acreage have been corrected to January 1, 1941, through cut-over records furnished by the Klamath Forest Protective Association and the U. S. Forest Service. Partial data have been secured for cutting during 1941, but for the most part acreages cut have been estimated to correct the virgin timber acreage up to January 1, 1942.

RESULTS OF THE SURVEY

Gross Loss

The survey of sample plots showed the gross loss of ponderosa pine due to western pine beetle attack during 1942 to be slightly lower than in 1941 (Table 1). The average gross loss on the 17 plots was 37 board feet per acre, or 0.28 percent of the stand, which is about two-thirds as great as the gross loss on these same plots in 1941. Generally speaking, the data indicate that there was but little change in the status of the infestation from 1941 to 1942. This is reflected in the estimates for the entire reporting area which are shown in Table 2. Approximately 29.5 million board feet gross loss was estimated for 1942 compared with about 33 million in 1941.

This apparent static condition tends to mask three important changes which occurred. The increase in infestation, threatened last year in the Embody unit of the Silver Lake area, levelled off so that the loss remained about the same. This is probably but a temporary lull because there are large bodies of high hazard ponderosa pine still remaining in this unit as well as in the Silver Creek unit to the south.

Quite the reverse situation has occurred in the Chewaucan area. A rather sharp increase was recorded for the Chewaucan unit, with lesser increases in the Coleman and Swamp Creek units. Although the 1942 gross loss in the area comprises only 32 board feet per acre, which is not an alarming percentage of the stand, the increasing infestation should be watched because it occurs in some fairly high hazard stands.

The Bly area is the third one worthy of special mention. This portion of the infestation decreased substantially, probably due partly to a natural decline and partly to increased logging activity in some of the high hazard stands. This area is pretty well cut out south of the highway and at the present rate will soon be cut over to the north. However, in the northern portion there will be a good residual stand left after logging. This residual stand comprises the thriftiest individuals in the original stand and it is anticipated that insect-caused losses will be very low.

Losses in other areas remained at about the 1941 level, the lowest ones being in the Warner Mtn., Klamath Marsh and Bonanza areas. The first two have always shown relatively low losses, probably due to their location at higher altitudes. The Bonanza area, however, is now nearly completely cut, which accounts for the low losses which now occur and probably will continue to occur in this area.

Net Loss

This is the second consecutive year in which ponderosa pine growth probably offset the insect-caused losses. It is difficult, however, to determine net loss or gain because there are no available data for ponderosa pine growth on cut-over lands, and in addition, part of the growth is offset by losses due to other agents such as wind.

Considering these factors, a net gain of about 40 board feet per acre in virgin stands appears to be a fair estimate for 1942. It is evident at once that this net gain is quite small even during a year when the infestation has reached the lowest point of the past two decades. Considering then that such low points are relatively rare in the history of the western pine beetle infestation in this region, it is natural to conclude that the net gain in growth during low infestation years is greatly outbalanced by the tremendous losses which occurred during the past two decades.

General Character of Infestation

Last year this low endemic infestation was characterized by scattered single trees, usually the more decadent individuals in the stand which were but lightly infested with the western pine beetle. Although the 1942 infestation still occurs in scattered, single decadent trees the character of the beetle broods is entirely different. Last year because of the light western pine beetle attacks and consequent greater available space, there was quite a miscellaneous collection of insects beneath the bark of an infested tree. In 1942, however, the density of western pine beetle attack is heavier and its broods appear more numerous.

Infestation Trend

The plot data from virgin plots for the past eleven years have been used as the base for the infestation trend curves shown in Figure 2. These curves are expressed as the ratio between the percent of stand killed each year and the percent of stand killed in 1937. This method has been used because it permits the adjustment of the base as plots are cut without necessitating the elimination of these earlier records. It also shows the trend of the infestation without the influence of varying stand volume so that the true relative trend is graphed. Three separate curves are shown because of differences in trends for these portions of the reporting area. Ecologically the Chewaucan, Dog Lake and Warner Mtn. areas are much the same and the infestation trends within these areas are also similar. For the same reason the Silver Lake and Sycan Marsh areas have been grouped as well as the Bly and Bonanza areas.

It is interesting to note the differences in these curves leading up to the very low point in 1942. The Bly-Bonanza curve shows a generally declining tendency, even after the abrupt drop in 1933. The Chewaucan-Dog Lake-Warner Mtn. curve, on the other hand, shows a general tendency to increase until the abrupt drop in 1940. All three curves practically meet in 1941 and continue on the same trend to another common point which is the lowest ever recorded in this reporting area during the last two decades.

Partial data for 1943 indicate that the common low point shown in the trend curves for 1942 is the end of the low infestation period. Increases are indicated in all units with the exception of Dog Lake.

The first increase will probably not exceed two or three times the 1942 infestation level, but such an increase will amount to a loss of from 0.5 to 0.7 percent of the stand - approximately offsetting current radial growth on virgin areas. Greatest increases are indicated in the Thomas Creek Unit of the Chewaucan Area, the Silver Creek Unit of the Silver Lake Area and generally throughout the Warner Mts. Area. Other serious increases, amounting to from three to four times the 1942 infestation, are indicated in the Meryl Creek Unit of the Bly Area and throughout most of the Chewaucan Area.

Other Insect Infestations

An outbreak of the spruce budworm (Cacoecia fumiferana Clem.) was reported in 1941 on the Crane Mtn. plot in the southern portion of the Warner Mts. area. This outbreak continued in intensity during 1942 and 1943 and at this time shows a considerable amount of twig mortality throughout the infested area. As yet, no actual tree mortality has been observed, but a number of the fir trees have been damaged repeatedly during the past three years and are now in such condition that some mortality is expected. There was no evidence that the boundary of the infested area had been extended this year.

A similar small local outbreak of the spruce budworm was found in 1942 in the Thomas Creek Unit in the southern portion of the Chewaucan area. This outbreak was examined in September, 1943, by Mr. Orr and the writer, at which time a heavy twig mortality on the fir was observed. Without the aid of actual surveys and twig counts, it is difficult to be certain, but it is the opinion of the writer that this infestation occurs over a lesser area than in 1942 and that the damage to fir twigs is not quite so severe.

The Great Basin tent caterpillar (Malacosoma fragilis Stretch) attacking bitter-brush was found this year in several localities throughout Oregon. However, it was not particularly prevalent in the Klamath Basin, except on the Klamath Indian Reservation. It was active in the Silver Lake Area, but the damage was not very extensive. For the most part, it was restricted to scattered clumps of bitter-brush and there was but slight twig mortality.

An outbreak of the lodgepole sawfly (Neodiprion burkei Midd.) along the Dalles-California highway increased in severity on the Klamath Indian Reservation. This infestation is extending its boundaries mainly to the westward and does not appear to be moving toward this reporting area, nor does the Long Bell Tract appear to be in any imminent danger.

A green aphid on fir foliage was quite prevalent in the southern portion of the Sycan Marsh Area and the northern portion of the Bly Area. A heavy concentration was noted on the Shake Butte plot where there was some yellowing of the needles on the fir reproduction.

CONTROL RECOMMENDATIONS

No direct control work is recommended for any of the insect infestations within this area at the present time. Even though increases in the western pine beetle infestation are indicated for 1943, the losses are yet very low and the infested trees are so scattered that treating them would be very costly. As for the other insect infestations, it is doubtful if a great deal of tree mortality will occur on this reporting area. What mortality does occur will be in reproduction size trees and in all probability will be beneficial in reducing competition rather than of a detrimental nature.

At the beginning of this upward swing in the western pine beetle infestation, we can anticipate several years of heavy timber loss. It would be highly desirable if at this time all high and medium hazard virgin stands had been treated with beetle control logging so that these anticipated losses would be minimized. It is fortunate, however, that most of the high hazard ponderosa pine stands within this reporting area have been cut or are being cut rapidly, particularly high hazard stands of the Bly area. The Silver Lake area is the only one remaining in this reporting unit where extensive virgin stands of high hazard still remain. Smaller amounts of high hazard stands are also located in the fringe timber of the Chewaucan area. Beetle control logging of the high risk trees on these areas would be highly desirable as a protective measure. Unless this can be done, or until these stands are reached with normal logging operations, these areas should be closely watched so that control measures can be applied whenever they become necessary.

Table 1: Pine timber killed by bark beetles on virgin sample plots - Fremont National Forest, Oregon, and adjacent private lands.

Area and Unit	Plot	CHECK PLOTS Timb'd. Acreage	Vol. of pine	LOSS FOR 1942 No. of trees	Volume b.m.	b.m. per acre	Percent of stand	Ratio to previous year
SILVER LAKE								
Embody	Rock Butte	320	5,620,000	26	23,530	74	0.41	0.73
	Antelope Spring	320	4,100,000	21	27,080	85	0.66	1.00
	Oatman Flat	245	2,740,000	17	17,170	70	0.63	0.98
	Total	885	12,460,000	64	67,780	77	0.54	0.88
Silver Cr.	Thompson Res.	270	2,100,000	24	13,010	48	0.62	0.56
	Rodman Pk.	320	4,850,000	8	7,630	23	0.15	0.36
	Total	590	6,950,000	32	20,640	35	0.30	0.49
SYCAN MARSH								
Hager	Sherlock	320	4,720,000	11	15,510	48	0.32	1.03
Currier Camp	Currier Camp	320	5,850,000	12	15,200	47	0.26	0.83
Merrit Cr.	Shake Butte	620	8,000,000	24	17,830	29	0.22	0.44
	Total	1,260	18,570,000	47	48,540	38	0.26	0.68
BLY								
Meryl Cr.	Meryl Springs	640	7,070,000	24	23,180	36	0.33	0.46
	North Sprague	640	8,720,000	18	30,140	47	0.34	0.43
	Total	1,280	15,790,000	42	53,320	41	0.33	0.44
CHEWAUCAN								
Thomas Cr.	Thomas Cr.	320	4,750,000	3	2,560	8	.05	0.82
Chewaucan	Taylor	320	3,450,000	6	7,990	24	0.23	5.75
Coleman	South Flat	320	4,000,000	7	9,470	29	0.23	0.45
	Total	960	12,200,000	16	20,020	20	0.16	0.76
WARNER MTN.								
Drake Pk.	Honey Creek	200	3,600,000	1	930	5	.03	-
Crane Mtn.	Crane Mtn.	320	4,100,000	2	3,510	11	.09	0.64
	Total	520	7,700,000	3	4,440	8	.06	0.75
DOG LAKE								
Dog Lake	Dog Lake	320	3,400,000	2	7,450	23	0.21	0.77
BONANZA								
Goodlowe	Goodlowe	600	6,000,000	20	14,300	24	0.24	1.41
	GRAND TOTAL	6,415	83,070,000	226	236,490	37	0.28	0.65

Table 2: Gross Insect-caused pine mortality. Fremont National Forest, Oregon, and adjacent private lands.

Area and Unit	PINE TYPE				ESTIMATED 1942 LOSS				
	Virgin acreage	Cut-over acreage	Total acreage	Total pine stand M b.m.	No. of trees	Volume M b.m.	No. trees per section	B.m. per acre	Percent of stand
SILVER LAKE									
Embody	57,000	1,000	58,000	578,000	4,500	3,600	50	62	0.62
Silver Cr.	71,000	0	71,000	700,000	3,000	2,900	27	40	0.41
Total	128,000	1,000	129,000	1,278,000	9,500	6,500	47	53	0.50
SYCAN MARSH									
Currier Camp	53,000	0	53,000	635,000	1,900	1,710	23	32	0.26
Hager	86,000	0	86,000	1,075,000	3,100	2,800	23	33	0.26
Summer Lake	20,000	0	20,000	130,000	1.000	600	32	30	0.46
Merrit Cr.	19,000	1,000	20,000	265,000	800	720	25	36	0.27
Total	178,000	1,000	179,000	2,105,000	6,800	5,830	24	32	0.27
CHEWAUCAN									
Thomas Cr.	33,000	29,000	62,000	480,000	2,000	900	21	14	0.19
Mill Flat	7,500	14,500	22,000	105,000	300	230	24	10	0.22
Swamp Cr.	34,500	1,500	36,000	290,000	1,500	830	26	23	0.28
Coleman	31,500	500	32,000	330,000	2,000	1,200	40	37	0.36
Chewaucan	47,000	3,000	50,000	570,000	6,000	3,360	77	67	0.58
Total	153,500	48,500	202,000	1,775,000	12,300	6,520	38	32	0.36
WARNER MTN.									
Drake Peak	38,000	15,000	53,000	490,000	1,200	700	14	13	0.14
Crane Mtn.	37,000	8,000	45,000	330,000	1,000	600	14	13	0.18
Total	75,000	23,000	98,000	820,000	2,200	1,300	14	13	0.16
KLAMATH MARSH									
Walker Rim	12,000	2,000	14,000	115,000	350	260	16	19	0.23
Bear Flat	58,000	0	58,000	600,000	1,400	1,260	15	22	0.21
Sugar Pine Mt.	21,500	1,500	23,000	220,000	400	400	11	17	0.18
Total	91,500	3,500	95,000	935,000	2,150	1,920	15	20	0.20

Table 2. (continued)

Area and Unit	PINE TYPE				ESTIMATED 1942 LOSS				
	Virgin acreage	Cut-over acreage	Total acreage	Total pine stand M b.m.	No. of trees	Volume M b.m.	No. trees per section	B.m. per acre	Percent of stand
BONANZA									
Swan Lake	4,000	59,000	63,000	50,000	2,000	100	20	2	0.20
Hildebrand	200	22,800	23,000	5,000	500	10	14	1	0.20
Rock Canyon	4,000	14,000	18,000	35,000	400	85	19	5	0.24
Royston	5,000	15,000	20,000	65,000	500	120	16	6	0.18
Goodlow	9,000	1,000	10,000	85,000	350	200	23	20	0.23
Gerber	1,800	1,200	3,000	12,000	100	40	20	13	0.33
Willow Flat	3,000	18,000	21,000	40,000	500	60	15	3	0.15
Bryant Mt.	6,000	11,000	17,000	45,000	400	85	16	5	0.19
Stukel Mt.	2,000	1,000	3,000	5,000	90	15	18	5	0.30
Total	35,000	143,000	178,000	340,000	4,840	715	17	4	0.21
BLY									
Meryl Cr.	44,500	6,500	51,000	590,000	2,500	1,800	31	35	0.30
Deming Cr.	18,200	5,800	24,000	190,000	1,000	600	26	25	0.31
Whitworth	18,600	8,400	27,000	258,000	900	590	21	21	0.23
Owens	12,400	11,600	24,000	165,000	1,000	500	26	21	0.30
Horsefly	18,000	13,000	31,000	110,000	1,500	450	31	14	0.40
Total	111,700	45,300	157,000	1,313,000	6,900	3,940	28	25	0.30
DOG LAKE									
Plateau	12,700	800	13,500	74,000	300	220	15	17	0.30
Barnes Valley	23,000	2,000	25,000	320,000	600	510	15	24	0.15
Four Mile	20,000	0	20,000	207,000	650	585	21	33	0.28
Hay Creek	9,500	8,000	17,500	80,000	400	200	15	11	0.25
Dog Lake	40,500	5,500	46,000	416,000	2,000	1,240	28	27	0.29
Quartz Mt.	8,000	25,000	33,000	50,000	500	100	10	3	0.20
Total	113,700	41,300	155,000	1,147,000	4,450	2,855	18	18	0.24
GRAND TOTAL	886,400	306,600	1,193,000	9,713,000	49,140	29,580	26	24	0.30